

USA Appln. No. 09/022,336
Applicant: William E. M. Jones et al
June 21, 2000

catalyst. These amendments are minor and fully supported in the specification as filed.

I. 35 USC 112 Rejections

Claims 22 and 24 stand rejected under 35 USC 112, second paragraph, as being indefinite, i.e., the terms "ceramic vessel" and "vessel" do not have proper antecedent basis. On further review it has been found that claims 20 and 21 also lack antecedent basis regarding the term "vessel". Accordingly, claims 20, 21, 22, and 24 were amended to replace the term "vessel" with the term "container" and thereby correct the lack of antecedent basis.

II. 35 USC 102(b) Rejections

Claims 15, 16, and 23 stand rejected under 35 USC 102(b) as being anticipated by Catylators Limited (CL) (Great Britain patent 871,605). The examiner notes Catylators at page 1, lines 16-60 and page 3, lines 9-15 with all of the drawing figures of Catylators .

Independent claim 15 is directed to a device for recombining gases in a storage battery which includes a gas-permeable catalyst container, said container comprising a flame arresting material having pores of suitable size to permit gas to pass therethrough and which acts as a barrier to a flame; and a gas-permeable hydrophobic coating encasing said container.

Claim 15 was rejected in view of Catylators. Catylators discloses a catalytic device for recombining hydrogen and oxygen evolved from an accumulator cell and returning the water so formed to the electrolyte. The catalyst is contained in a capsule made of porous glass or ceramic material, preferably with a pore size of 70-100 microns, that will resist the entry of electrolyte but will permit entry of hydrogen and oxygen and the emergence of vapor. See Catylators, p. 1, lines 49-56. No flame arresting feature is discussed.

An anticipation rejection requires that all elements be disclosed in a single

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reference. Claim 15 of the present invention requires the container to comprise a flame arresting material as highlighted above. As discussed on page 17 of the present application, the flame arresting material has pores allowing hydrogen, oxygen and vapor to pass through, but prevents a flame from passing through which could ignite gases outside the container in the battery cell housing. This element is not taught in Catylators. The basis for this rejection is unclear as the examiner has made no indication as to where the flame arresting limitation is disclosed, either expressly or inherently, in Catylators. Thus, all elements are not disclosed and the invention as claimed is not in the public domain. If the examiner believes that Catylators discloses the flame arresting limitation, applicants respectfully request that the examiner provide the reasoning for this belief so that this issue can be addressed.

Since all elements are not disclosed, claim 15 is believed patentable.

Claim 16, dependent from claim 15, is likewise believed patentable.

Claim 23 depends from claim 15 and likewise is believed patentable. Furthermore, claim 23 has been amended to include the limitation that the hydrophobic coating comprises PTFE. This limitation, in the claimed combination, is not taught or suggested by the art of record and thus believed patentable.

III. 35 USC 103(a) Rejections

Claims 7-13, 15, 22, 24, 26-30, 32 and 35 stand rejected under 35 USC 103(a) as being unpatentable over Kreidl et al. in view of Catylators.

The examiner argues that the only features not shown by Kreidl are the particular vessel encompassing the catalyst, the size of the vessel and for the amount of catalyst present. The examiner argues that to include in Kreidl the vessel of Catylators would have been obvious for its improved "flame resistant properties." Applicants respectfully traverse.

First, as discussed above, Catylators does not disclose anything regarding a

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flame arresting material. As discussed on page 17 of the present application, the flame arresting material has pores allowing hydrogen, oxygen and vapor to pass through, but prevents a flame from passing through which could ignite gases outside the container 42 in the battery cell housing. Even assuming that the capsule 3 of Catylators is fire resistant, there is no teaching that it is a flame arresting material, i.e., will stop a flame from passing through which could ignite gasses outside the capsule.

Kreidl is likewise silent on any flame arresting material. Moreover, Kreidl teaches a device which controls the rate of recombination at the catalyst surfaces to limit the temperature of the recombination reaction and thereby avoid ignition of the gasses in the first place. See Kreidl at Column 1, lines 32-37 and 49-56. It does this by providing a multistage catalyst device where one group of catalyst has high level gas recombination capabilities which initiates the recombination, and a group of low level catalyst which normally recombine gasses at a lower rate, but which rate increases as heat builds from the recombination by the first group of catalyst to thereby prevent any major temperature increase.

It is further noted that Kreidl is for a sealed battery and not a VRLA (valve regulated lead acid).

Independent claim 7, as amended, is directed to a VRLA electric cell which includes

- a pressure relief valve
- a gas-permeable catalyst container in gas communication with said gas space, said container comprising a flame arresting material having pores of suitable size to permit gas to pass therethrough while being a barrier to a flame, said container being encased in a gas-permeable hydrophobic coating; and
- a catalyst arranged in said catalyst container for converting oxygen gas and hydrogen gas which is generated in the housing to water vapor.

As discussed above, neither Kreidl nor Catalytors discloses a container

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comprising a flame arresting material having pores of suitable size to permit gas to pass therethrough while being a barrier to a flame. As the proposed combination of Kreidl and Catalytors does not teach or suggest all claim elements, claim 7 is believed patentable. Moreover, even assuming that Catylators discloses a flame arresting material, which it does not, the examiner has not pointed to any motivation to modify Kreidl to add a container with a flame arresting material when Kreidl limits the temperature of catalyst recombination to prevent a flame in the first place. Claim 7 is thus believed patentable.

Claim 12, depending from claim 7, requires the catalyst container to be secured to the relief valve to be removeable from the housing with the relief valve. This limitation is not disclosed or suggested in Kreidl or Catylators, nor is this combination of claim 12 taught or suggested in the art of record. Claim 12 is thus patentable for this reason and the reasons set forth for claim 7.

Claim 15 was rejected under 35 USC 102 as discussed above, and also under 35 U.S.C. 103. As discussed above regarding claim 7, neither Kreidl nor Catalytors discloses container comprising a flame arresting material having pores of suitable size to permit gas to pass therethrough while being a barrier to a flame. This element is missing from the proposed combination of art and thus claim 15 is believed nonobvious and thus patentable.

Claim 22, now depending from claim 15, was also amended to include the limitation that the hydrophobic coating comprises PTFE. This limitation in the present combination is not taught or suggested and thus claim 22 is believed patentable.

Claim 24 has been amended to depend from claim 17 which has been objected to and thus is believed to be patentable. Claim 24 is likewise believed patentable for at least the same reasons.

Independent claim 27 is for a vent assembly for sealing a VRLA cell that includes a pressure relief valve member and a gas-permeable catalyst container supported on said [vent] body to be in gas communication with said gas space when said vent assembly seals the battery cell, said catalyst container comprising a flame arresting material having pores of suitable size to permit gas to pass therethrough while being a barrier to a flame, said container being encased in a gas-permeable hydrophobic coating; and a catalyst arranged in said catalyst container for recombining oxygen gas and hydrogen gas generated in the cell to water vapor.

First, as discussed above with respect to claim 7, Catylators does not disclose anything regarding the container comprising a flame arresting material. Secondly, similarly as discussed with respect to claim 12 above, neither Kreidl or Catylators teaches nor suggests that the catalyst container be secured to the vent body of the vent assembly (which also includes a pressure relief valve member). Since all limitations of the combination are not taught or suggested, claim 27 is believed patentable.

Claims 28, 29, and 30, depending from claim 27 are believed patentable for at least the reasons set forth for claim 27.

Claims 32 and 35, depending from claim 15, are likewise patentable for at least the reasons for claim 15. Claims 32 and 35 were also amended for further clarification.

IV New Claims

New claims 36, 37 (depending from claim 7) and 38, 39 (depending from claim 27) add various PTFE limitations regarding the gas-permeable hydrophobic coating. These limitations in the respective combinations are believed patentable. See claims 14 and 17 which are believed to be patentable if rewritten in independent form. These claims are fully supported in the application as filed.

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New independent claim 40 is a combination directed to a device for recombining gases in a storage battery which includes a gas-permeable catalyst container formed of a flame arresting material having pores of suitable size to permit gas to pass therethrough and which acts as a barrier to a flame, and a PTFE gas-permeable hydrophobic encasement of said container.

Neither Kreidl nor Catalytors teaches or suggests a container formed of a flame arresting material, and furthermore, neither teaches or suggests a PTFE gas-permeable hydrophobic encasement of said container. It is noted that claim 17, for a claim a slightly different scope, includes a PTFE film limitation and was noted as objected to in the office action and thus believed allowable as discussed above. New claim 41, depending from claim 40, further limits the PTFE encasement to a film and thus believed patentable for this additional reason. Claims 40 and 41 are fully supported in the application as filed.

Independent claim 42 is similar to claim 40, here the PTFE gas-permeable hydrophobic material is attached externally to and surrounds the container. This is not taught or suggested in shown in Kreidl or Catylators.

CONCLUSION

For the reasons set forth above, claims 7-9, 12, 14-25, 27-30 and 32-42 are believed patentable. If any issues remain applicant request an interview prior to the next office action.

Respectfully submitted,



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